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PRESENTATION AND MAJOR DESIGN ASPECTS OF THE CYCLADES COMPUTER NETWORK

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SUMMARY

A computer network is being developed in France, under government sponsorship, to link about twenty heterogeneous computers located in universities, research and D.P. Centers. Goals are to set up a prototype network in order to foster experiment in various areas, such as : data communications, computer interaction, cooperative research, distributed data bases. The network is intended to be both, an object for research, and an operational tool.

In order to speed up the implementation, standard equipment is used, and modifications to operating systems are minimized. Rather, the design effort bears on a carefully layered architecture, allowing for a gradual insertion of specialized protocols and services tailored to specific application and user classes.

A particular objective, for which CYCLADES should be an operational tool, is to provide various departments of the French Administration with access to multiple data bases located in geographically distant areas.

Host-host protocols, as well as error and flow control mechanisms are based on a simple message exchange procedure, on top of which various options may be built for the sake of efficiency, error recovery, or convenience. Depending on available computer resources, these options can be implemented as user software, system modules, or front end processor package. For each of them, network-wide interfaces are defined, to conserve consistency in human communications.

CYCLADES uses a packet-switching sub-network, which is a transparent message carrier, completely independent of host-host conventions. While in many ways similar to ARPANET, it presents some distinctive differences in address and message handling, intended tofacilitate interconnaction with other networks. In particular, addresses can have variable formats, and messages are not delivered in sequence, so that they can flow out of the network through several gates toward an outside target.

Terminal concentrators are mini-hosts, and implement whatever services users or applications require, such as sequencing, error recovery, code translation, buffering, etc. Some specialized hosts may be installed to cater for specific services, such as mail, resource allocation, information retrieval, mass storage. A control center is also being installed and will be operated by the French PTT.

I - INTRODUCTION

CYCLADES is one the more recent computer network projects, which has been launched in France beginning with 1972. Its conception carries most of the characteristics found in the type of general purpose heterogeneous computer network such as experimented by ARPA, or proposed by NPL.

Our goals are to construct a prototype network in order to foster experiments in various areas, such as : data communications, computer interaction, cooperative resesrch, distributed data bases. This action is twofold. In order to acquire valid experience, the network must also be used in a realistic environment, which requires a variety of operational services acceptable by customer standards.

In order to speed up the implementation, standard equipment is used, and modifications to operating systems are minimized. Rather the design effort beers on a carefully layered architecture, providing for an extensible structura of protocols and network services, tailored to various classes of traffic and applications.

This concern for built-in evolutionism translatea itself in putting as few featuras as possible at levels buried in the sensitive parts of the network. With experience gradually building up, and depanding on trends in international standards, more stable characteristics will eventually emerge. By putting them at some lower system level, it will be possible to obtain higher efficiency and reduce duplication, at the cost of freezing a few more parameters.

The Cyclades design attempts to be both precise and independent from the implementation at the user level, so that heterogeneous sites can have their way, and still communicate with others in a consistent manner.

II - PARTICIPANTS AND EQUIPMENT

Cyclades is sponsored by the Délégation à l'Informatique, a government agency in charge of coordinating all activities related to computing. Participating centers are only partially funded and put their own contribution on a voluntary basis. In a first stage, all network centers are research oriented organizations, univeraities, or engineering schools. In a second stage some D.P. centers of tha French Administration will be connected to phase in real applications.